Banisteria, Number 34, pages 3-16
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An Annotated List of the Caddisflies (Trichoptera) of Virginia: Part III. Emendations and Biogeography

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ABSTRACT

Ten species of caddisflies collected in Virginia since 2007 are added to the list of known native species occurring in the Commonwealth, bringing the total to 361. Most species are more or less statewide in distribution, but for others a clear distinction between boreal and austral patterns is evident, apparently reflecting environmental constraints of the immature stages. A considerable number of species reach their range limits within the state, mostly as the southern extremity of northern forms, but northern and eastern terminations are also evident. Several cases of lowland disjunctions of montane species are noted. A possible total of 400 resident species does not seem unlikely.

Key words: Caddisflies, distribution, Trichoptera, Virginia.

INTRODUCTION

The two preceding parts of our summary of the caddisfly fauna of Virginia (Flint et al., 2004, 2008) documented a total of 351 species confirmed as native to the Commonwealth, 73 of them hitherto unpublished records. Ten additional species discovered by recent collecting increase the total to 361 species, surpassing the numbers published for Alabama (Harris et al., 1991) and Tennessee (Etnier et al., 1998) for the greatest known diversity of any eastern state.

Nonetheless, since a number of other species are known to occur in adjacent states north, west, and south of Virginia, it is inevitable that continued inventory work will discover instate populations of many of these potential additions and this seems especially true for species of Hydroptilidae. Although collections have been made in virtually all of Virginia's political divisions, the fact that so many of our resident species are known from less than five counties indicates that 361 is by no means an accurate approximation of the actual number of these insects that occur in this state. As many as 400 species does not seem unlikely, an estimate that seems justified by the following ten additions, all of which were made during the past several years, and seven of them from Caroline County, from which 56 species were previously known.

I. ADDITIONS TO THE TRICHOPTERA FAUNA OF VIRGINIA

**Hydropsyche* (*H.*) *decalda* Ross: This seldom reported species is known all along the Gulf Coast states from Texas to Florida and up the Atlantic Coastal Plain as far as southern Delaware with a questionable record from Connecticut. This is the first report from the Coastal Plain in Virginia. Caroline Co., Lonesome Gulch Pond, Fort A.P. Hill Mil. Res., 38.102°N, 77.343°W, 10 June 2008, 2♂, 1♀ (NMNH); same, but Lonesome Gulch beaver pond, 26 May 2009, 3♂ (NMNH).

**Orthotrichia dentata* Kingsolver & Ross: Originally described from Florida, the species subsequently has been recorded from Mississippi and South Carolina. This is the first record from Virginia where it was taken in the Coastal Plain. Caroline Co., Jordan Crossing Pond, Fort A.P. Hill Mil. Res., 38.148°N, 77.375°W, 10 June 2008, 1♂ (NMNH); same, but 26 May 2009, 6♂, 3♀ (NMNH); same, but Lonesome Gulch, beaver pond, 38°06.1'N, 77°20.6'W, 20 July 2009, 26♂, 8♀ (NMNH); same, but Turkey Track Cr., pond above Jeff Davis Dr., 38°07.2'N, 77°22.1'W, 21 July 2009, 4♂, 10♀ (NMNH).

**Oxyethira anabola* Blickle: This species has a wide distribution in eastern North America. It is reported from Newfoundland west to Michigan and south to Alabama, with most records from New England. This first record from Virginia is from the Coastal Plain. Caroline Co., pond, 1 km S Range Control, Fort A.P. Hill Mil. Res., 38.062°N, 77.370°W, 10 June 2008, 1♂, 1♀ (NMNH).

**Oxyethira glasa* (Ross): This is a species primarily of the southeastern United States, being reported from Oklahoma and Louisiana east to Florida and north to South Carolina. Although only females have been taken in Virginia, the identification seems certain. Cleared females were compared with cleared females from a series containing both sexes collected in Florida, and they were found to be identical. It is another species taken up to now only in the Coastal Plain at Fort A.P. Hill in Caroline County. Caroline Co., Fort A.P. Hill, Turkey Track Cr., pond above Jeff Davis Dr., 38°07.2'N, 77°22.1'W, 21 July 2009, 6♀ (NMNH); same, but Lonesome Gulch, beaver pond, 38°06.1'N, 77°20.6'W, 20 July 2009, 1♀ (NMNH).

**Triaenodes nox* Ross: The species has a widespread, but scattered, distribution in North America, being recorded from Quebec south to Florida and west to Wisconsin and Mississippi with an outlying record from British Columbia. This first record from Virginia is from the upper Coastal Plain. Caroline Co., Turkey Track Cr., Jeff Davis Dr., Fort A.P. Hill, 38°07.2'N, 77°2.1'W, 26 May 2009, 1♂, (NMNH).

**Chimarra florida* Ross: This species is another one limited to the Coastal Plain, being recorded from New Jersey to Florida and west to Mississippi. Lago & Harris (1987) recorded variants in the genitalia of this species - this one from Virginia is very similar to the variant from New Jersey. These are the first examples known from Virginia. Caroline Co., Jordan Crossing Pond, Fort A.P. Hill Mil. Res., 38.148°N, 77.375°W, 10 June 2008, 1♂ (NMNH); same, but 26 May 2009, 4♀ (NMNH); same, but outlet creek, Jordan Crossing Pond, 57♀ (NMNH); same, but Lonesome Gulch beaver pond, 38°06.1'N, 77°20.6'W, 4♀ (NMNH); same, but Turkey Track Cr., pond above Jeff Davis Dr., 38°07.2'N, 77°22.1'W, 21 July 2009, 1♀ (NMNH).

**Paranyctiophylax banksi* (Morse): This is another wide-ranging, but seldom reported, species of eastern North America. It is recorded from Quebec west to Minnesota and south to Alabama and Mississippi (these latter two records may be misidentifications of the closely related *P. barrorum*, J. C. Morse *in litt.*). This new record from Virginia is from the Cumberland Plateau in the far western part of the state. Dickenson Co., Breaks Interstate Park, porch at motel, 4 June 2008, 1♂, (NMNH).

**Polycentropus carlsoni* Morse: This is a rarely reported species known previously only from Alabama, South Carolina, and North Carolina. In addition to the below recorded collections, there is a single male from Montgomery County, Maryland in the NMNH. The Virginia collections were made primarily from a small trickle, which may dry up in summer, that is a tributary to the Potomac River. Fairfax Co., Turkey Run Park, Gulch stream, 38°57.9'N, 77°09.7'W, 9 collections, 2 May-21 Oct 2008, 128♂, 121♀ (NMNH); same, but W riverside, 38°58'N, 77°09.6'W, 23 Aug-18 Sep 2006, 1♂ (NMNH); same, but 3 collections, 18 May-27 Sep 2007, 6♂, 1♀ (NMNH); same, but 5-19 June 2008, 1♂ (NMNH); same, but riverside, 38°57.9'N, 77°09.4'W, 31 May-13 Jun 2007, 1♂ (NMNH); same, but by headquarters, 38°57'43", 77°08'53"W, 19 September-11 October 2006, 1♂ (NMNH). VA: Fairfax Co., Great Falls, swamp trail, 38°59.4'N, 77°15.2'W, 12-26 Jul 2007, 1♂ (NMNH).

**Rhyacophila simmonsi* Armitage: This species was recently described based on a series of males and larvae collected in southwest Virginia (Armitage, 2008). It is a member of the *lieftincki* group, 12 species of which are found in eastern and southeastern Asia, one in western North America, and now *R. simmonsi* in Virginia. Smyth Co., N. Fork Holston River, RM85.6, Bradford Ford near McCready, 36.903°N, 81.734°W, 16 March 1990, 6♂ (NMNH, ROM, BJAC); same, but RM 91.6, 6 Nov 1988, 2 larvae.

**Agarodes crassicornis* (Walker): This species is an inhabitant of the Atlantic Coastal Plain, recorded from Maryland to Florida and Mississippi. There is a pair of examples from the Pine Barrens in eastern New Jersey in the collection of the NMNH. The Virginia collection is from the Coastal Plain. Caroline Co., Lonesome Gulch Pond, Fort A.P. Hill Mil. Res., 38.102°N, 77.343°W, 10 June 2008, 2♀ (NMNH); same, but Jordan Crossing Pond, 38.148°N, 77.375°W, 2♀ (NMNH).

II. BIOGEOGRAPHIC PATTERNS

Although our knowledge of caddisfly distribution in Virginia is still woefully incomplete, existing information is sufficient to permit some general inferences about the different patterns of dispersal, here summarized as a set of models to be tested by subsequent collecting activities. These images are presented in two major categories, one treating species' ranges in the broad sense, the other categorizing patterns as expressed within the state by groups of species collectively.

A. Instate Distributional Limits

The known ranges of a number of caddisflies terminate somewhere in Virginia, reflecting the basic distribution of the species. Some categories are very provisionally recognized, with several representative species cited for each.

1. Southern Appalachian taxa known in Virginia only from the Mount Rogers-White Top massif include *Arctopsyche irrorata*, *Parapsyche cardis*, *Wormaldia mohri*, *Rhyacophila mycta*, and *Lepidostoma mitchelli*.

Several species, however, extend somewhat farther northward, typically along the Blue Ridge, with their terminal county indicated: *Phylocentropus auriceps* (Franklin), *Cheumatopsyche etrona*, *Pycnopsyche flavata*, and *Goerita semata* (Patrick), *Brachycentrus spinae* (Amherst), *Lepidostoma tibiale* (Giles), *Hydroptila coweetensis*, *Dolophilodes major*, and *Rhyacophila teddyi* (Page-Madison).

2. Species restricted to southern United States whose ranges terminate in the Virginia Coastal Plain include *Orthotrichia dentata*, *Oxyethira glasa*, and *Ceraclea protonepha*.

3. Somewhat more widely distributed austral species whose northernmost known locality lies in the Virginia Piedmont region: *Hydropsyche catawba*, *H. fattigi*, *H. mississippiensis*, *H. rossi*, *Chimarra augusta*, and *Ceraclea neffi*.

4. Many caddisfly taxa whose basic distributions lie to the north of Virginia extend southward through the Appalachians at increasingly higher elevations, ending in the Great Smokies or northern Georgia. However, a number of such species occur no farther south than somewhere in western Virginia. Some representatives with their county of record are: *Glossosoma lividum* (Bath), *Cheumatopsyche gracilis* (Washington), *Homoplecta monticola* (Wythe & Tazewell), *Hydropsyche walkeri* (Washington), *Agraylea costello* (Giles), *Hydroptila dentata* (Rockbridge), *H. metoeca* (Smyth), *Ochrotrichia denningi* (Botetourt), *Polycentropus pixi* (Bath), *Rhyacophila manistee* (Smyth), and *Nemotaulius hostilis* (Highland).

Several northern species occur in Virginia as populations seemingly very disjunct from the main body of their known ranges: *Hydroptila acadia* (Dismal Swamp region, from Nova Scotia), *H. ajax* (Washington Co., from West Virginia and Kentucky), *H. eramosa* (Tazewell Co., from Ontario), and *Ceraclea ruthae* (Highland Co., from northern Pennsylvania).

5. A smaller contingent of species with "interior/Midwestern" distributions occurs in western Virginia in the tier of counties adjacent to West Virginia and Kentucky. Some represent apparent disjunctions from the main body of the species' range: *Hydroptila artesa* (Bath Co., from the Ozark region), *H. lonchera* (Louisa Co., from a Cumberland Plateau – New Hampshire range), and *Polycentropus interruptus* (southeastern counties, from Tennessee).

B. Instate Distributional Patterns

The extent to which the caddisfly fauna of the cities and counties of Virginia has been sampled is indicated by Fig. 1. On that as well as all other maps, the Fall

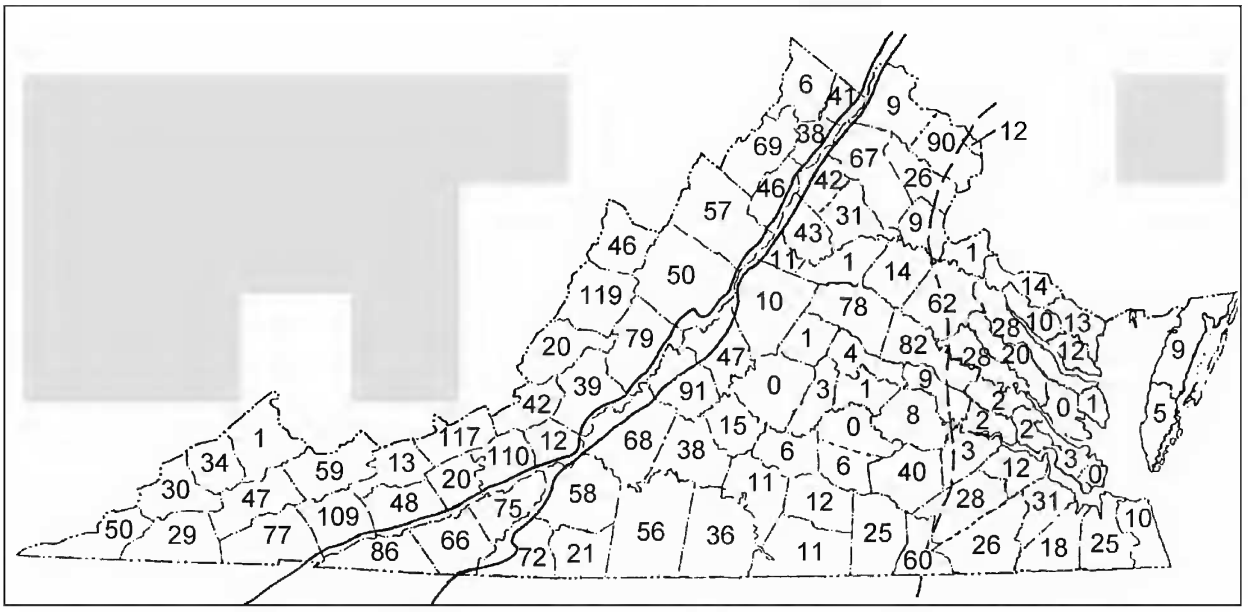


Fig. 1. The counties of Virginia with number of documented caddisfly species indicated for each, including several former counties that became co-extensive when incorporated as cities. Lack of space did not permit entries for small independent cities (e.g., Galax, Radford).

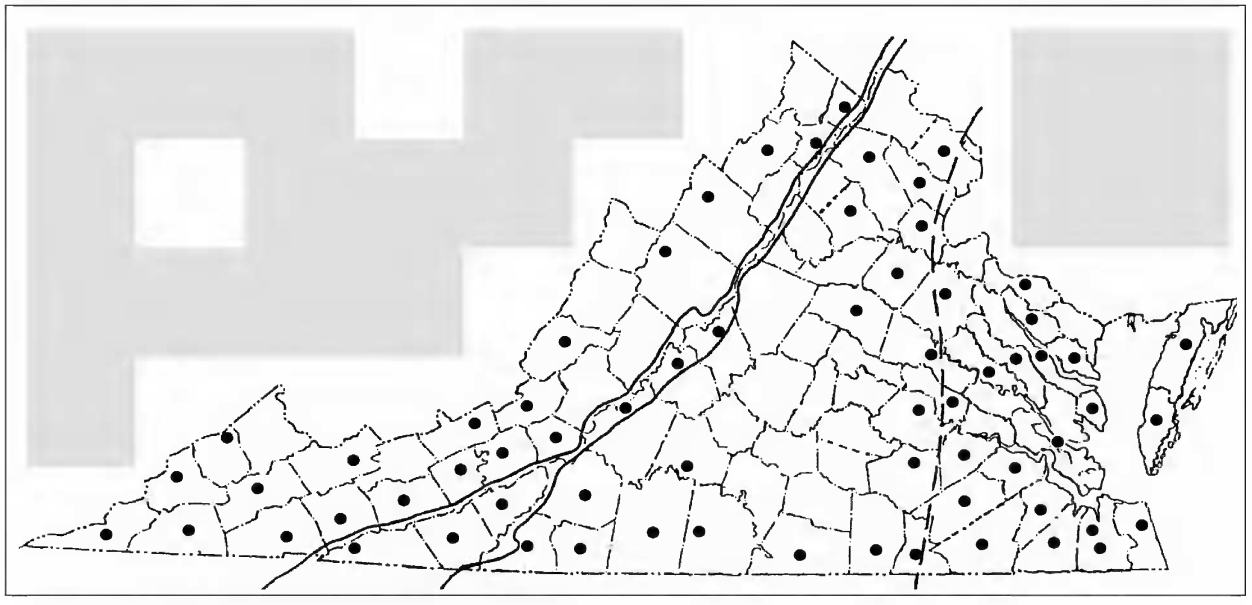


Fig. 2. County distribution for *Oecetis inconspicua*, the most frequently-collected species in our fauna. The lack of records for Bath County, otherwise with 119 species, is remarkable.

Line is shown by an undulate broken line, and the Blue Ridge set off by two solid lines running northeast-southwest. The very uneven distribution of numbers of species reflects both accessibility of collecting sites, collector bias, and specific site emphasis, as well as the actual diversity of the region. It is likely, for instance, that the fauna of the two Eastern Shore counties will not be much greater than the current figures suggest. Few counties in the Coastal Plain per se are likely to harbor more than about 50 species. Twelve counties and (county-sized) cities in Virginia currently have only one to three confirmed species, with four additional counties completely lacking caddisfly records.

The high figures for Caroline, Hanover, and Greensville counties reflect their location on the Fall Line, with both warm and cool water habitats as well as preferential collecting. Low numbers in the central and southern Piedmont are due primarily to neglect.

Counties in and west of the Blue Ridge vary widely in terms of their known faunas, largely a function of collector bias, but it is reasonable to assume that most of them are inhabited by as many as 150 species.

If geomorphic units are distinguished instead of political boundaries, it is entirely likely that the Mount Rogers/Iron Mountain region contains at least 200 caddisfly species, for instance.

A large number of our species are essentially statewide in range, as exemplified by what is doubtless our most frequently collected species, *Oecetis inconspicua* (Fig. 2). It is a singular fact that this ubiquist has not yet been found in Bath County, which boasts the greatest number of resident species.

Aside from the euryzonal species that occur nearly statewide, the most pervasive distributional pattern reflects the classic dichotomy of warm- vs. cold-adapted species. For caddisfly larvae, this translates into the combination of temperature, oxygenation, and chemical composition of the water in which they live. By looking at spot maps for those species that are common and frequently collected, it is possible to detect some general patterns, shared by a substantial number of species and frequently also observed by aquatic animals in other groups. One significant generality is the notable "layering effect" in progressing from species confined to the Coastal Plain (e.g., warm, low oxygen water) into taxa capable of living also in the different conditions of ever more inland and upland habitats.

"Austral/warm-adapted/thermophilic" patterns

1. In the Coastal Plain only (Fig. 3), their ranges often extending from New Jersey to Florida and westward. Some Virginia examples include *Leptocerus americanus*, *Oecetis osteni*, *Triaenodes abus*, *Molanna uniophila*, and *Ceraclea protonepha.*

2. In the Coastal Plain and Piedmont (Fig. 4), e.g., *Hydropsyche rossi* and *Macrostemum carolina.*

3. Coastal Plain, Piedmont, and sporadic sites at low elevations in the Blue Ridge and westward (Fig. 5). *Oecetis nocturna* provides one example. Collection records suggest that the more inland localities represent dispersal along the courses of larger streams.

4. A number of species, particularly hydropsychids, occur in Virginia solely in the Piedmont, where some attain their northernmost known limits (Fig. 6): *Hydropsyche catawba*, *H. fattigi*, *H. mississippiensis*, *Cheumatopsyche parentum*, *Hydroptila quinola*, *Neotrichia vibrans*, and *Ochrotrichia tarsalis.*

"Boreal/cold-adapted/psychrophilic" patterns

5. At high elevations (>1,000 meters) only in the Alleghanies (Fig. 7), *Banksiola dossuaria.*

6. Widespread on and west of the Blue Ridge (Fig. 8): *Protoptila maculata*, *Cheumatopsyche gracilis*, *C. minuscula*, *C. sordida*, *C. wrighti*, *Hydropsyche cheilonis*, and *H. potomacensis.*

7. Mountains and Piedmont only, e.g., general west of the Fall Line (Fig. 9), including *Cheumatopsyche campyla*, *C. ela*, *C. geora*, *Hydropsyche bronta*, *H. scalaris*, *H. sparna*, *Macronemum zebratum*, *Chimarra aterrima*, *C. obscura*, *Mystacides sepulchralis*, and *Psychomyia flavida.*

A considerable number of species are widespread on and west of the Blue Ridge, but also occur across the *northern* third of the Piedmont, west of a line between Charlottesville to Arlington. This is curious because the climate of the northern Virginia Piedmont is as warm as that anywhere in the state.

Unusual patterns

8. A surprisingly large number of species are documented in Virginia so far only from the Blue Ridge itself (Fig. 10): *Agapetus pinatus*, *Cheumatopsyche halima*, *Dolophilodes major*, *Rhyacophila appalachia*, *R. teddyi*, *Adicrophleps hitchcocki*, *Brachycentrus spinae*, *Micrasema burksi*, and *Goerita stylata.* Such a geographic constraint is curious, perhaps representing surviving populations of species that formerly existed also westward in the Alleghanies.

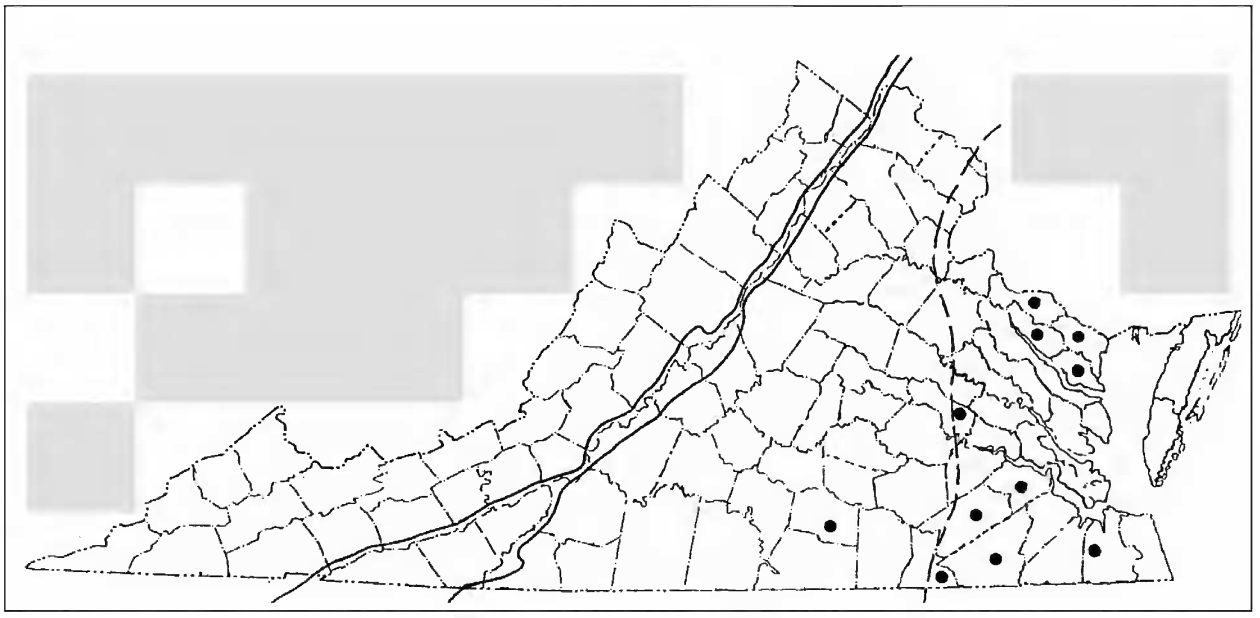


Fig. 3. County distribution of *Oecetis osteni*, a species basically restricted to the Coastal Plain in Virginia. The single disjunct spot in Lunenburg County possibly represents the capture of an adventive individual; confirmation of this record is desirable.

Fig. 4. County distribution of *Hydropsyche rossi* (▲) and *Macrostemum carolinum* (●), two Coastal Plain species which extend sporadically westward onto the Piedmont.

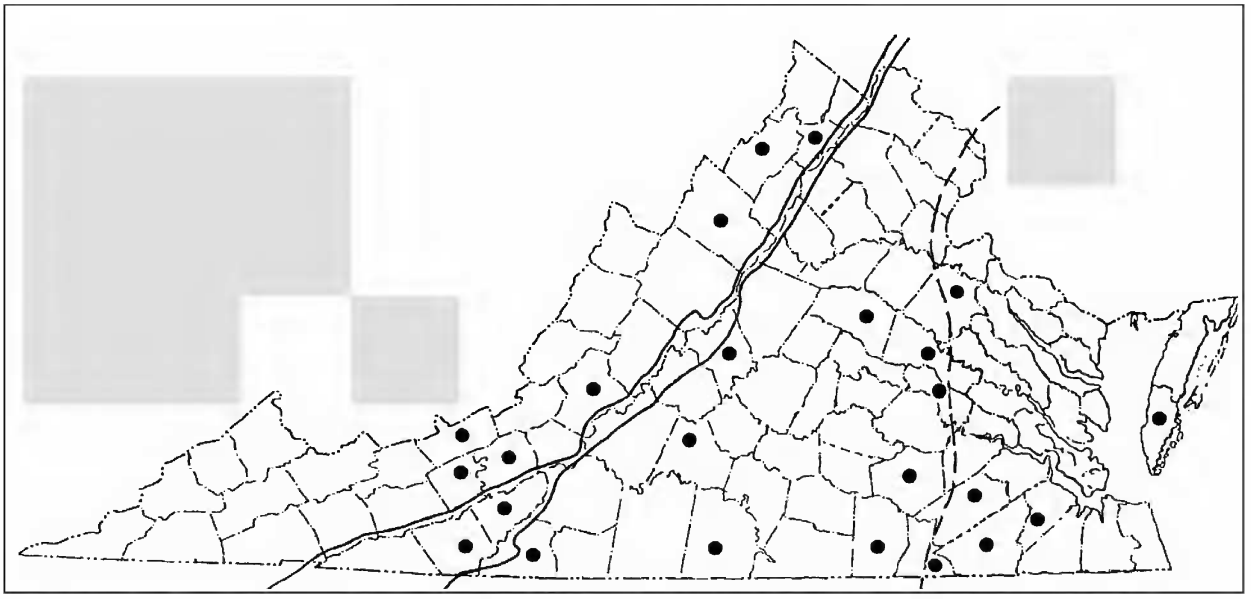


Fig. 5. County distribution of *Oecetis nocturna*, an example of an "austral" species that also occurs west of the Blue Ridge at lower elevations (recent peripheral migrants?).

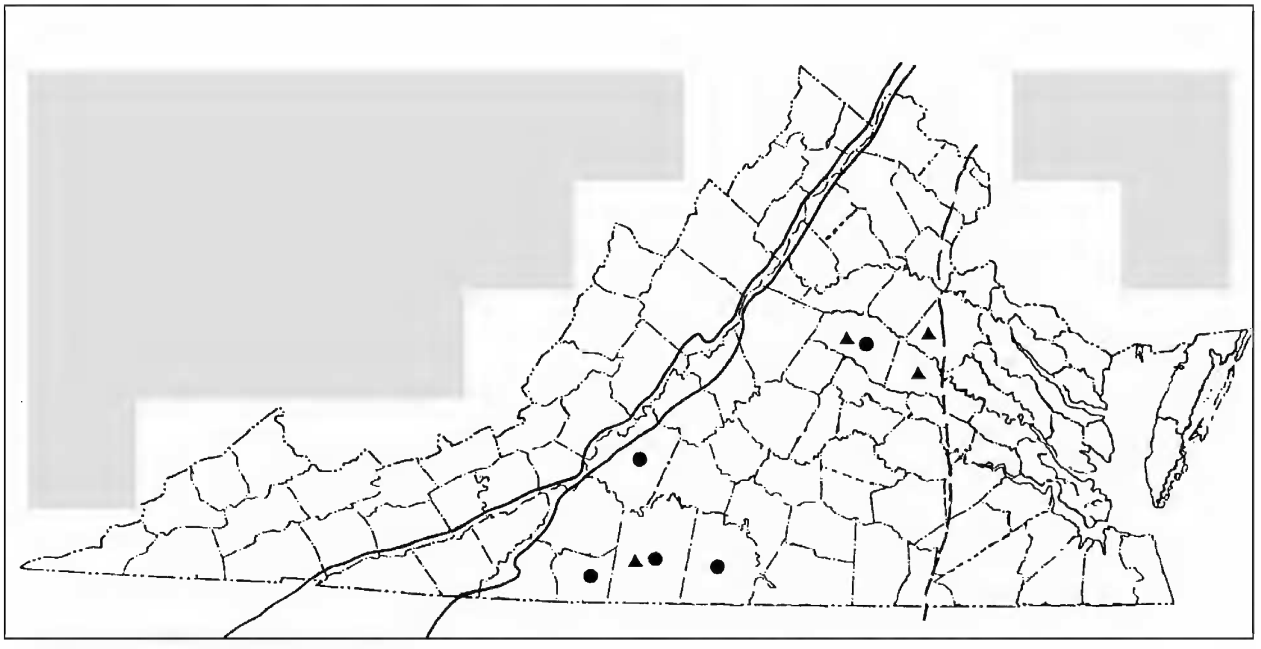


Fig. 6. County distribution of two caddisflies whose ranges in Virginia are restricted to the Piedmont: *Hydropsyche catawba* (▲) and *H. mississippiensis* (●).

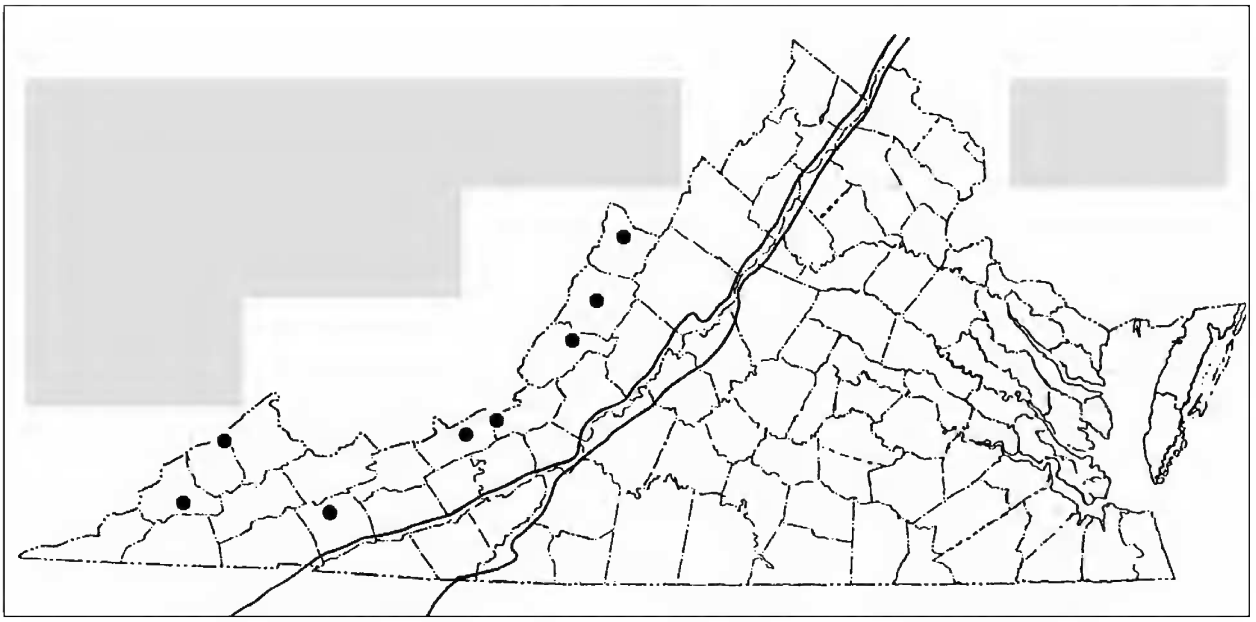


Fig. 7. County distribution of *Banksiola dossuaria*, a species of northern affinities that occurs in Virginia at elevations above 1,000 meters in the Alleghanies and Cumberland Plateau regions.

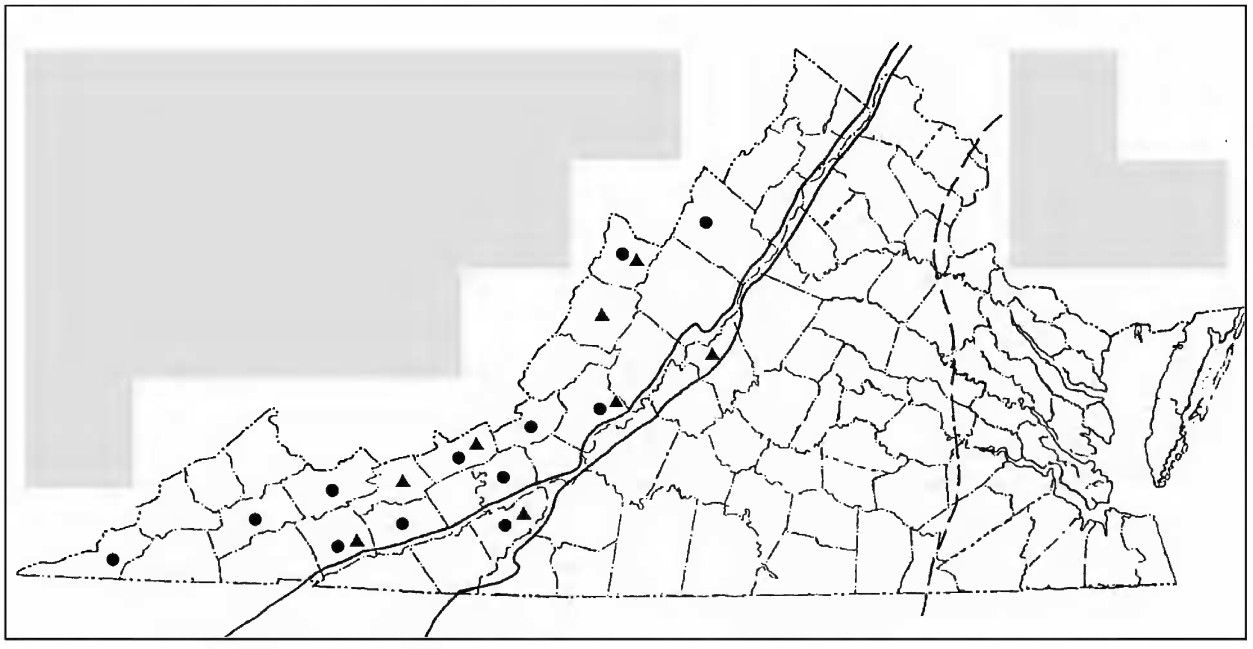


Fig. 8. County distribution of *Hydropsyche potomacensis* (●) and *Cheumatopsyche wrighti* (▲), occurring in both the Blue Ridge and Alleghanies.

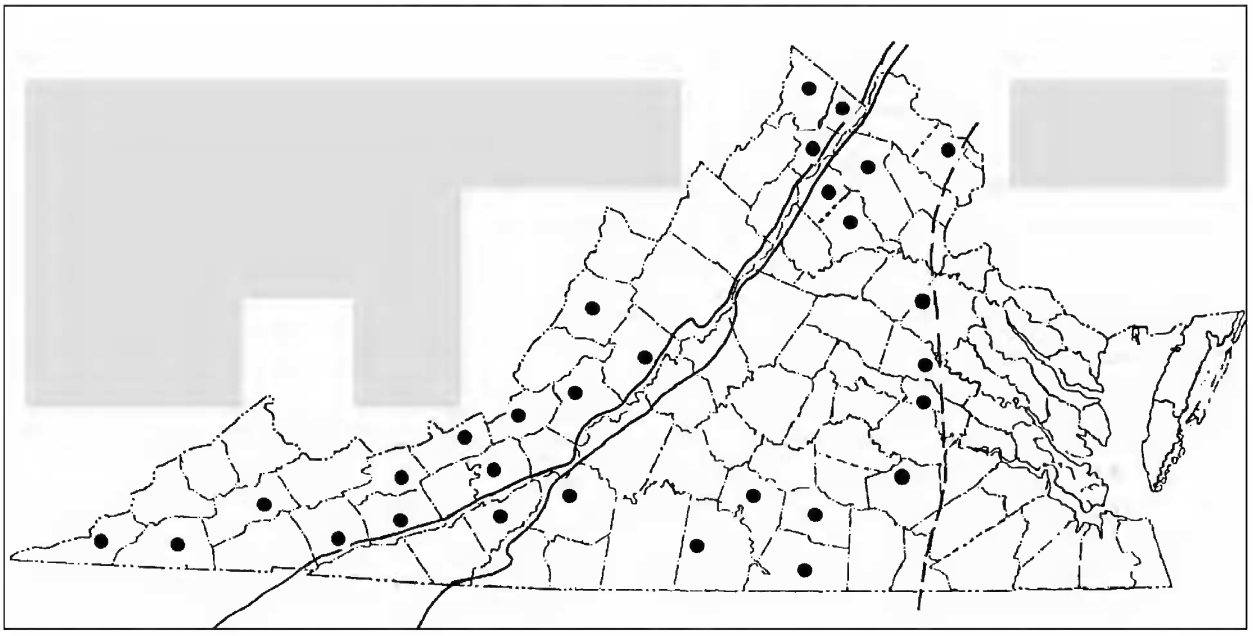


Fig. 9. County distribution of *Mystacides sepulchralis*, widespread in the Piedmont and mountains but absent from the Coastal Plain, a common pattern among Virginia caddisflies.

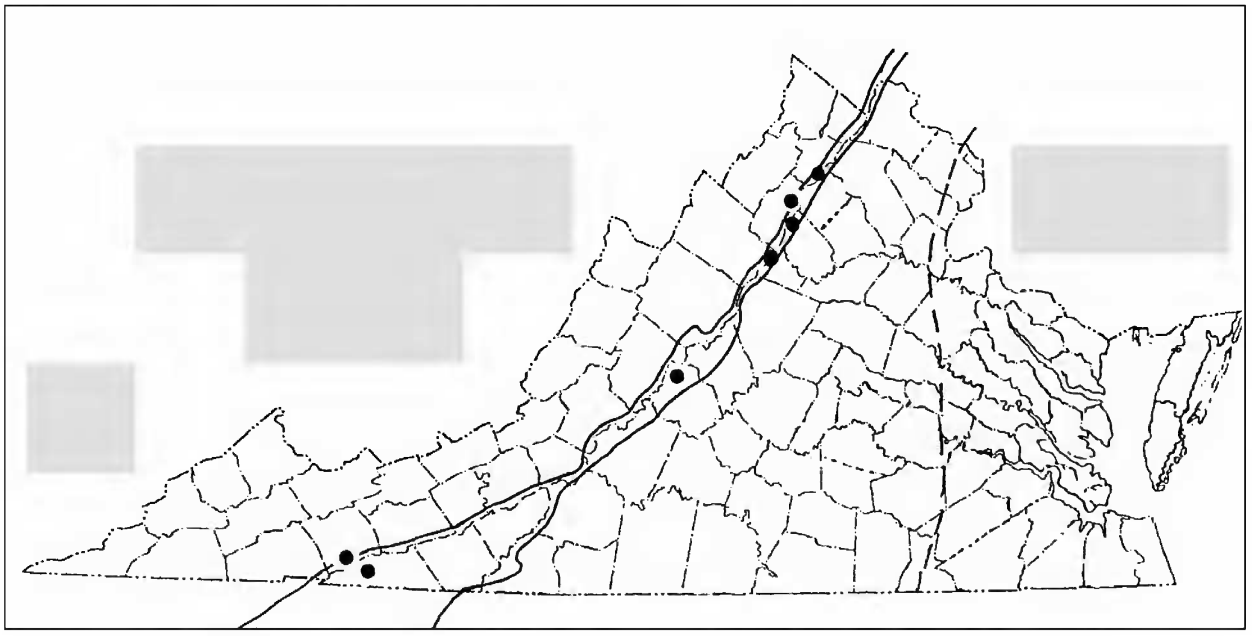


Fig. 10. County distribution of *Dolophilodes major*, one of several species known only from the Blue Ridge.

9. An interesting pattern reflects the classical "Lower Austral" distribution: widespread east of the Blue Ridge but also present in the far southwestern counties, where the valleys of the upper Tennessee River system, as well as the adjacent low mountains of the Appalachian Plateau, are occupied (Fig. 11). This pattern is seen in a considerable number of strictly terrestrial organisms, vertebrates as well as arthropods. Caddisfly examples include *Phylocentropus placidus*, *Nectopsyche pavida*, and *Ironoquia kaskaskia.*

10. A substantial number of species occur in Virginia only in and west of the New River Valley, but *exclusive of the Iron Mountain region* (Fig. 12). Some of these are quite local, some are dispersed westward in the Cumberland Plateau, a few others (e.g., *Rhyacophila atrata)* extend far northward. Without sorting into such categories, this caddisfly fauna contains: *Agapetus tomus*, *Hydropsyche bassi*, *H. depravata*, *H. etnieri*, *H. rotosa*, *Hydroptila eramosa*, *H. fiskei*, *H. grandiosa*, *Rhyacophila otica*, *Neophylax acutus*, *N. etnieri*, and *N. toshioi.*

11. The distribution of one common species commands attention. *Phryganea sayi* (Fig. 13) appears at first glance to be statewide, but available records indicate three prominent lacunae. There are no collections from Virginia Beach, Chesapeake, and the two Eastern Shore counties, all of which have been extensively surveyed in recent years, although the species extends as low as sea level in Mathews, York, and Lancaster counties. There are no records for the central and northern Alleghanies, north of Clifton Forge, even for thoroughly sampled Bath County and the northern Blue Ridge. Thirdly, there are no records for the Mount Rogers region: Smyth, Grayson, and Washington counties. This large and usually abundant caddisfly could scarcely be overlooked in even the most superficial collecting. Elevation is not a factor: *P. sayi* has been found above 3,000 feet (900 m) in both Tazewell and Floyd counties.

12. Last, but surely not least, is a small contingent of species whose ranges are basically montane, but which also occur at favorable sites on or below the Fall Line in eastern Virginia (Fig. 14): *Lepidostoma tibiale*, *Ceraclea diluta*, *Limnephilus moestus*, and *Triaenodes perna.* Existing records imply that these species apparently are absent from the Piedmont. Perhaps such insects are Post-Pleistocene climatic relicts that survived the warmer Hypsithermal Interval in localized cool habitats.

EPILOGUE

In retrospect, it is obvious that current knowledge of the caddisfly fauna of Virginia is scarcely more than a window into a future of unlimited discoveries: still more additions to the state fauna, new localities for both counties and species which are now so poorly represented, even still undescribed species. It is hoped by the compilers of the present list that a future generation of investigators will be challenged to confront the problems we have uncovered and exploit the world of discoveries afforded by the caddisflies themselves. Preparation of a comprehensive *Trichoptera of Virginia* should now be regarded as an attainable goal.

ACKNOWLEDGEMENTS

We thank those who have aided in this study, especially the many individuals who have collected specimens over many decades and then deposited them in institutional collections. We are grateful to Dr. J. Reese Voshell and Mr. Steve Hiner for providing access to the aquatic insect collections at VPI & SU. Very important collections were made by Dr. Steven M. Roble and the staff of the Virginia Division of Natural Heritage, particularly Ms. Anne C. Chazal and Mr. Christopher S. Hobson; these collections are placed in the Virginia Museum of Natural History. Mrs. Kristine L. Brown, Department of the Army at Fort A.P. Hill facilitated access to the post where valuable collections have been recently made. The various reviewers have made important suggestions and caught many errors; we thank them all.

LITERATURE CITED

Armitage, B.J. 2008. A new species in the *Rhyacophila lieftincki* group (Trichoptera: Rhyacophilidae) from southwestern Virginia. Zootaxa 1958: 65-68.

Banks, N. 1904. A list of the neuropteroid insects exclusive of the Odonata, from the vicinity of Washington, D.C. Proceedings of the Entomological Society of Washington 6: 201-217.

Banks, N. 1907. Catalogue of the Neuropteroid Insects of the United States. American Entomological Society, Philadelphia, PA. 53 pp.

Banks, N. 1914. American Trichoptera – notes and descriptions. Canadian Entomologist 46: 261-268.

Fig. 11. County distribution of *Nectopsyche pavida*, an austral species that extends northward in the Cumberland Plateau region and occurs in extreme southwest Virginia while absent from the Blue Ridge and folded Appalachians.

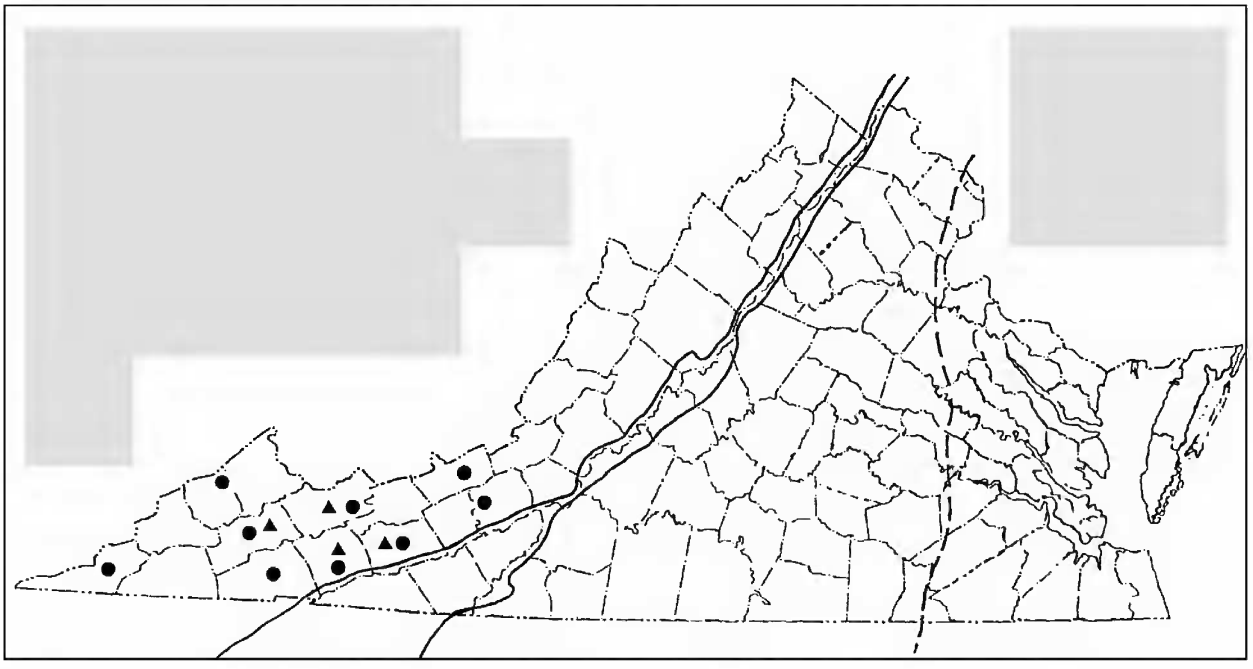


Fig. 12. County distribution for two species of western affinities confined to the Alleghany and Cumberland Plateau regions, west of the New River Valley: *Hydropsyche depravata* (●) and *Neophylax toshioi* (▲).

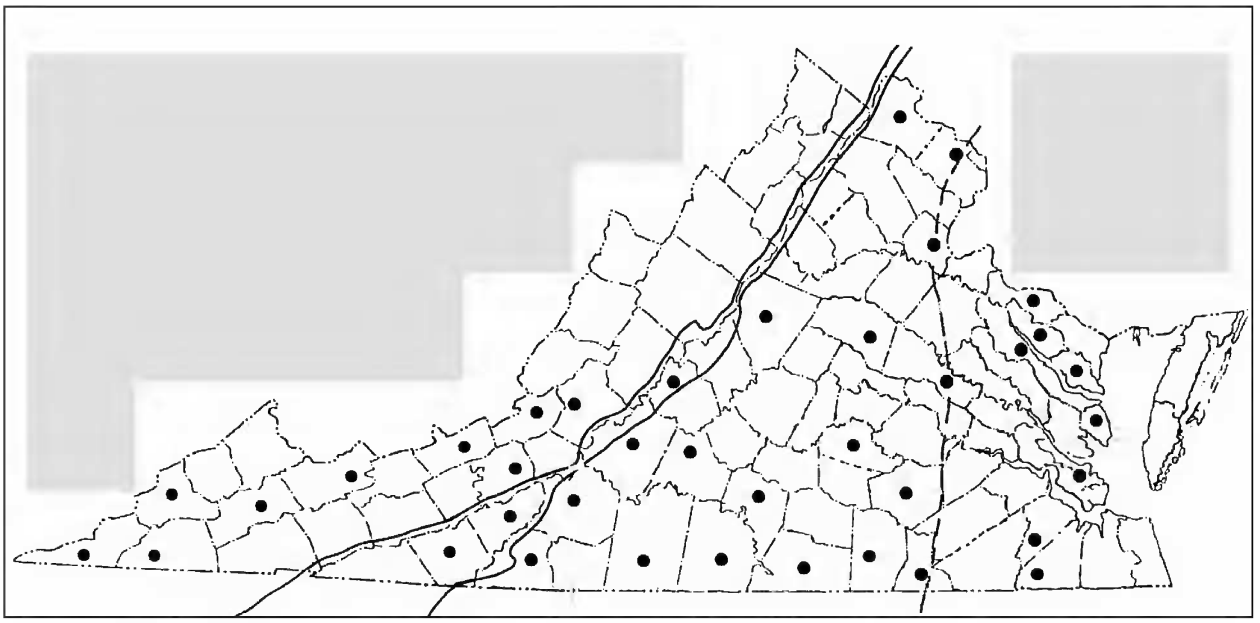


Fig. 13. County distribution of *Phryganea sayi*, a common species for which there are no extant records for several well-sampled regions of Virginia.

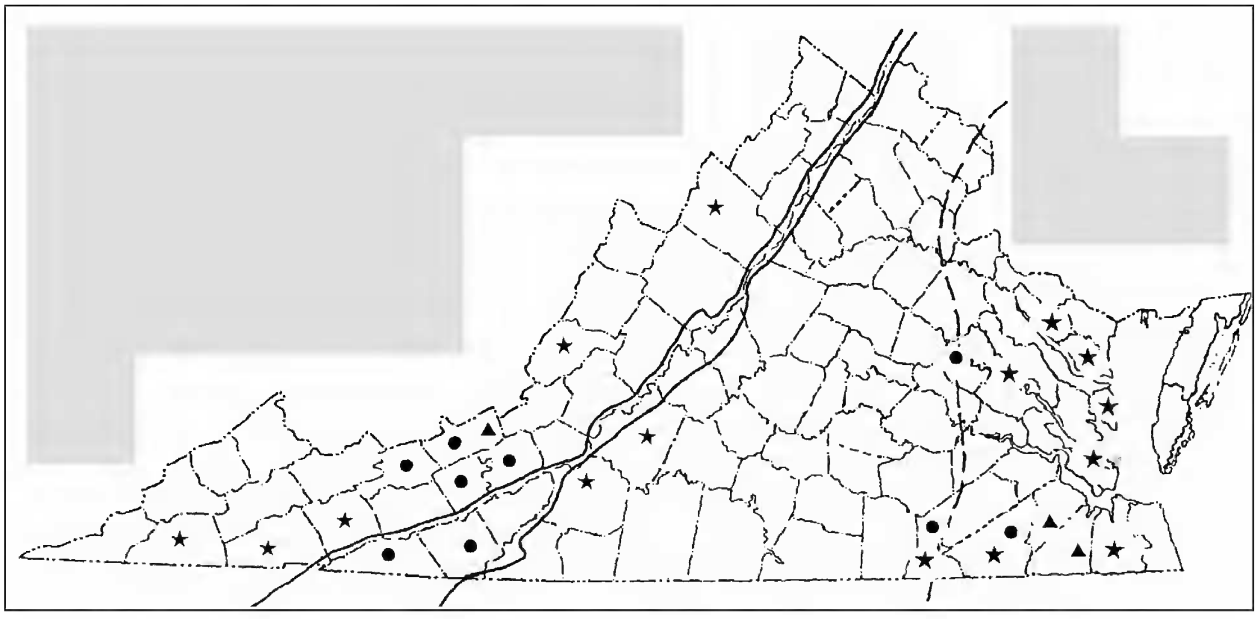


Fig. 14. County distribution of *Lepidostoma tibiale* (●), a southern Appalachians endemic represented by disjunct populations on or near the Fall Line, and *Limnephilus moestus* (▲), a boreal species extending as far south as North Carolina, with two relict populations known from the Coastal Plain. *Triaenodes perna* (★) represents a similar distribution.

Betten, C. 1934. The caddis flies or Trichoptera of New York State. New York State Museum Bulletin 292: 1-576.

Blahnik, R.J., & R.W. Holzenthal. 2006. Revision of the genus *Culoptila* (Trichoptera: Glossosomatidae). Zootaxa 1233: 1-52.

Carnagey, D.W., & J.C. Morse. 2006. Females of the genus *Ceraclea* (Trichopera: Leptoceridae) in North America: taxonomy and classification. Contributions of the American Entomological Institute 34(2): 1-86.

Chapin, J.W. 1978. Systematics of Nearctic *Micrasema* (Trichoptera: Brachycentridae). Unpublished M.S. thesis. Clemson University, Clemson, SC. 136 pp.

Etnier, D.A., J.T. Baxter, Jr., S.J. Fraley, & C.R. Parker. 1998. A checklist of the Trichoptera of Tennessee. Journal of the Tennessee Academy of Science 73: 53-72.

Flint, O.S., Jr. 1984. The genus *Brachycentrus* in North America, with a proposed phylogeny of the genera of Brachycentridae (Trichoptera). Smithsonian Contributions to Zoology 398: 1-58.

Flint, O.S., Jr. 2007. Synonymy of some eastern North American species of *Apatania* (Trichoptera: Apataniidae). Proceedings of the Entomological Society of Washington 109: 739-740.

Flint, O.S., Jr., A. Englund, & B. Kumashiro. 2003. A reassessment and new state records of Trichoptera occurring in Hawai'i with discussion on origins and potential ecological impacts. Records of the Hawaii Biological Survey for 2001-2002. Bishop Museum Occasional Papers 73: 31-40.

Floyd, M.A. 1995. Larvae of the caddisfly genus *Oecetis* (Trichoptera: Leptoceridae) in North America. Bulletin of the Ohio Biological Survey, New Series 10 (3). 85 pp.

Glover, J.B. 1996. Larvae of the caddisfly genera *Triaenodes* and *Ylodes* (Trichoptera: Leptoceridae) in North America. Bulletin of the Ohio Biological Survey, New Series 11 (2). 89 pp.

Harris, S.C., P.E. O'Neil, & P.K. Lago. 1991. Caddisflies of Alabama. Geological Survey of Alabama Bulletin 142: 1-441.

Hoffman, R.L., & C.R. Parker. 1997a. Caddisflies from Greensville County, Virginia (Insecta: Trichoptera). Banisteria 9: 17-32.

Hoffman, R.L., & C.R. Parker. 1997b. *Limnephilus moestus* Banks, a northern caddisfly in the Atlantic Coastal Plain (Trichoptera: Limnephilidae). Banisteria 10: 25-26.

Johanson, K.A. 1998. Phylogenetic and biogeographic analysis of the family Helicopsychidae (Insecta: Trichoptera). Entomologica Scandinavica Supplement 53: 1-172.

Johanson, K.A. 2002. Systematic revision of America *Helicopsyche* of the subgenus *Feropsyche* (Trichoptera: Helicopsychidae). Entomologica Scandinavica Supplement 60: 1-147.

Lago, P.K., & S.C. Harris. 1987. The *Chimarra* (Trichoptera: Philopotamidae) of eastern North America with descriptions of three new species. Journal of the New York Entomological Society 95: 225-251.

Manuel, K. [in press] The longhorn caddisfly genus *Triaenodes* (Trichoptera: Leptoceridae) in North America. The Caddis Press, Columbus, OH.

Moulton, J.K. 2007. New additions to the caddisfly fauna (Trichoptera) of Tennessee and Virginia, U.S.A. Entomological News 118: 209-210.

Parker, C.R. 1998. A review of *Goerita* (Trichoptera: Goeridae), with description of a new species. Insecta Mundi 12: 227-238.

Parker, C.R., & J.R. Voshell, Jr. 1981. A preliminary checklist of the caddisflies (Trichoptera) of Virginia. Journal of the Georgia Entomological Society 16: 1-7.

Parker, C.R., & G.B. Wiggins. 1987. Revision of the caddisfly genus *Psilotreta* (Trichoptera: Odontoceridae). Royal Ontario Museum, Life Science Contributions 144: 1-55.

Roble, S.M., & O.S. Flint, Jr. 2001. *Nemotaulius hostilis* (Trichoptera: Limnephilidae), a boreal caddisfly new to the Virginia fauna. Banisteria 18: 35-37.

Roeding, C.E., & L.A. Smock. 1989. Ecology of macroinvertebrate shredders in a low-gradient sandy-

bottomed stream. Journal of the North American Benthological Society 8: 149-161.

Ross, H.H. 1944. The caddis flies, or Trichoptera, of Illinois. Illinois Natural History Survey Bulletin 23: 1-326.

Ross, H.H. 1956. Evolution and Classification of the Mountain Caddisflies. University of Illinois Press, Urbana. 213 pp.

Schefter, P.W., G.B. Wiggins, & J.D. Unzicker. 1986. A proposal for assignment of *Ceratopsyche* as a subgenus of *Hydropsyche*, with new synonyms and a new species (Trichoptera: Hydropsychidae). Journal of the North American Benthological Society 5: 67-84.

Schmid, F. 1982. Revision des Trichoptères Canadiens. I. Les Glossosomatidae et Philopotamidae (Annulipalpia). Mémoires de la Société Entomologique du Canada 122: 1-76.

Schuster, G.A. 1979. On the identity of *Molanna ulmerina* Navas (Trichoptera: Molannidae). Entomological News 90: 249-250.

Vineyard, R.N., G.B. Wiggins, H.E. Frania, & P.W. Schefter. 2005. The caddisfly genus *Neophylax* (Trichoptera: Uenoidae). Royal Ontario Museum, Contributions in Science 2. 141 pp.

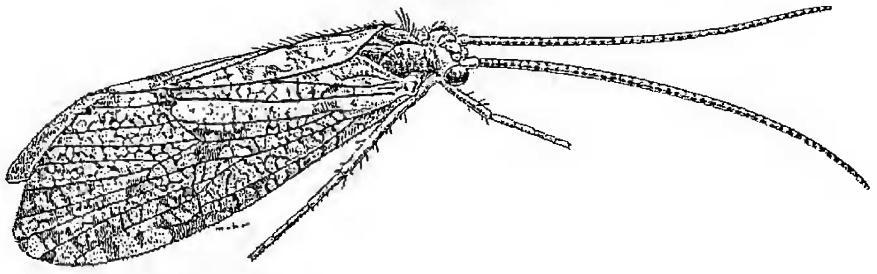
Weaver, J.S., III. 1988. A synopsis of the North American Lepidostomatidae (Trichoptera). Contributions of the American Entomological Institute 24(2): 1-141.

Weaver, J.S., III. 2002. A synonymy of the caddisfly genus *Lepidostoma* Rambur (Trichoptera: Lepidostomatidae), including a species checklist. Tijdschrift voor Entomologie 145: 173-192.

Wiggins, G.B. 1998. The Caddisfly Family Phryganeidae (Trichoptera). University of Toronto Press, Toronto. 306 pp.

Wojtowicz, J.A. 1982. A review of the adults and larvae of the genus *Pycnopsyche* (Trichoptera: Limnephilidae) with revision of the *Pycnopsyche scabripennis* and *Pycnopsyche lepida* complexes. Unpublished Ph.D. thesis. University of Tennessee, Knoxville. 292 pp.

Wojtowicz, J.A., & O.S. Flint, Jr. 2007. A new species of *Pycnopsyche*, *P. pani* (Trichoptera: Limnephilidae), from the mountains of North Carolina and Virginia. Pp. 349-354 *In* J. Bueno-Soria, R. Barba-Álvarez, & B. Armitage (eds.), Proceedings of the XIIth International Symposium on Trichoptera. The Caddis Press, Columbus, OH.



Banksiola crotchi Banks (from Ross, 1944).